

LBNL SAFETY REVIEW COMMITTEE

**Triennial Review of the
Management of Environment, Safety, and Health**

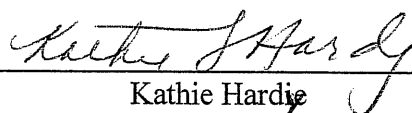
**Chemical Sciences Division
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LBNL Safety Review Committee

Triennial Review of the Chemical Sciences Division Management of Environment, Safety and Health (MESH)

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A. Executive Summary

The Chemical Sciences Division has a satisfactory ES&H management system in place. The core functions are, for the most part, adequately addressed. The Review Committee has also noted a number of improvements and noteworthy practices. However, concerns arise as a result of unevenness in aspects of the program and some areas where assurance of oversight is vague.

Previous MESH reviews had identified areas of communication, review, inspection and training as needing attention. While progress has been made in communication and inspection as noted below, systematic oversight, review and training, in particular for campus staff, are still problematic. Suggestions have been made, based on other Lab examples of policy and procedures that work. CSD has not yet developed similar programs to address these areas. The recent cooperative work on inspections at the campus is, however, an excellent step in this direction.

The Division has augmented its person-to-person communication by utilizing Level-1 e-mails and expecting more discussion of ES&H issues by Principal Investigators with their groups. The ES&H Committee has also been improved to include additional members and more frequent meetings.

After several years of low accident and incident rate, this year the Division experienced multiple injuries and adverse events. Though it may not indicate a pattern, it does emphasize the importance of reviewing systems regularly.

Overall, the Division has made improvements to their systems since the last MESH Review and seems committed to continuing this effort. The Division Director is confident that PIs are not just doing the minimum and other staff has observed that ES&H is more actively supported.

B. Description of the Appraisal Process

The objective of the MESH Review is to evaluate the quality and effectiveness of the Division's management of ES&H in the work performed by staff. The review recognizes noteworthy practices in the Division ES&H program and identifies concerns.

The appraisal process included: a review of responses to the MESH Questionnaire and the supporting documentation; meetings with the Director, Deputy Director, Business Manager, ES&H Coordinator and representatives of the scientific groups; a tour of one of the laser experimental facilities.

C. Description of Division

The Chemical Sciences Division consists of approximately 210 employees, students and guests. The staff is organized into four departments: Chemical Physics; Actinide Science; Atomic, Molecular and Optical Sciences; and Catalytic Science. Division workspace is located in buildings 2, 6, 10, 50B, 50F, 62, 66, 70A, 71D, 71G and 88. The Division also operates the Chemical Dynamics beamline and the Molecular and Environmental Sciences (MES) beamline at the Advanced Light Source. Research also takes place on the University of California Berkeley campus. Approximately 60% of Division staff work almost exclusively on campus.

The Chemical Sciences Division carries out fundamental research in the chemical sciences and engineering to provide a basis for new and improved energy technologies and for understanding and mitigating the environmental impacts of energy use. Research focuses on catalysis, actinide chemistry, reaction dynamics and photoionization.

Chemical Sciences Division has an ES&H Coordinator responsible for overseeing the Division's safety program and implementing the Division's Integrated Safety Management Plan. The Division Deputy is also actively involved in implementation of the safety program. The EH&S Division Liaison serves as a resource for health and safety needs. These three individuals, along with the CSD Safety Review Committee member and the Division representative to the Laboratory Laser Safety Committee meet monthly to discuss ES&H performance and policy.

D. Results of the MESH Appraisal

The appraisal results are organized by areas of inquiry from the MESH questionnaire, which follows the core functions of Integrated Safety Management. Findings are broken into three categories: concerns addressing insufficient systems, potential problems, or unsatisfactory trends that may result in regulatory violations; observations indicating areas where improvement is warranted but not in violation of regulations or Berkeley Lab policy; and noteworthy practices recognizing excellent procedures and systems.

1. Work Planning

The area of work planning, as well as the other core functions are complicated by the dual make-up of the Division with so many activities taking place on the campus.

The Division has an ISM plan which it issues to all Principal Investigators who are expected to discuss this with their groups. The Division still relies heavily on personal one-to-one contact to communicate on ES&H issues which can be very effective, if not systematic. However, the Division has made improvements. It has begun to use Level-e-mails to distribute information and the e-mail list includes campus staff. In addition to the annual meeting this year there was an added meeting for undergraduates, graduate students, post-docs and Division management.

The Division has also augmented its ES&H Committee by including additional staff (see above) and it now meets monthly. It also appears from sample documentation that meetings of administrative and scientific groups are including ES&H topics more frequently.

Projects are reviewed during the Field Work Proposal process which includes assessment of potential ES&H impacts on research costs. Formal authorizations are completed for hazardous work.

Noteworthy: The Division requires and maintains an email list for all staff, including those on campus. This allows the Division management to notify everyone of safety issues and policy changes.

Noteworthy: The Division does a substantial amount of work at the ALS. It appears that the two Divisions work well together on EH&S issues and they maintain clear lines of authority. They make sure that Users do not spend too many hours working on the beamline, usually splitting their shifts into 12 hour groups that start at 5 AM or PM.

Concern: The ISM plan is not current. For example, the Division plan calls for everyone to take the JHQ, but only LBNL located staff do so. Training statistics are high for the Lab site. However, there is no current system to assure that campus staff has taken their required training. A tailored JHQ or a tracking plan for campus courses would resolve this issue.

2. Hazard Identification and Risk Analysis

CSD staff works with a wide range of hazards in division workspace, including chemical, radioactive, laser, X-ray, electrical, glass handling, and ergonomic. The Division has two Radiological Work Permits, six Radioactive Work Authorizations (RWAs), and two Sealed Source Authorizations. Chemical Sciences also has 20 Activity Hazard Documents, 15 related to laser work, and five related to chemical hazards. The Division has 22 Satellite Accumulation Areas (SAAs), including five with Mixed Waste, and 12 Radiological Waste Collection Areas.

The tasks of hazard identification and risk analysis are the responsibility of the PIs. In addition to the FWP process and the preparation of formal authorizations each PI completes an assessment sheet which covers, among other topics, workplace inspections for hazards. There is also a hazard checklist for campus areas.

Noteworthy: CSD found a way to have their campus labs inspected. This showed initiative and their ability to work around perceived problems. This should serve them well as an example for other Lab/campus issues.

Institutional Concern: There is a perceived two class system, where campus work does not appear to have the same oversight. This was mentioned by staff at all levels. It appears that the LBNL safety requirements do improve safety, but individuals feel unsure about the benefit/cost. Consistency might be addressed in a review of the MOU.

Observation: It was noted that there is some confusion about when a Laboratory authorization actually takes effect. Some work was going on before the authorization was completed by EH&S.

3. Establishment of Controls

In the area of administrative and engineering controls of experimental activities there are gaps in the Division program. While formal authorizations for high-hazard activities appear to be well-conceived, identification and control of lower level hazards is left up to the “good judgment” of the individual PI and there is no actual system or review for self-authorizations.

In addition, there were two significant problems in the area of adhering to the requirements of authorizations this year (see below), one involving operating a laser system without proper authorization and the other not understanding specific hazard conditions.

The Division has done a very good job with completion of JHQs and training for LBL staff but continues to struggle with training issues for campus staff. Some progress is being made (see Noteworthy practice below).

Ergonomics is well-addressed for administrative staff but not yet for all scientific staff. The Division has indicated that it intends to request systematic evaluations for all the groups located on the LBL site.

Noteworthy: All admin staff have professional ergonomic evaluations performed every two years or when changes or made or as requested.

Noteworthy: CSD is actively working to augment laser safety training for campus located staff to better ensure it meets the high standards of LBNL's laser safety program. This effort included a supplemental course delivered by the LSO at a campus location.

Institutional Concern: While formal authorizations are prepared for high-hazard activities, there is no systematic assurance that low-hazard activities are reviewed and appropriately addressed.

4. Work Performance

There were a number of deficiencies connected with work performance in the past year. These included one QA violation, two ORPS, and two accidents. All were addressed and corrective actions complete but this is the highest number of problems that have occurred in the last three years. It may not be statistically significant but it does suggest that oversight systems may need review.

Concern: There appears to be some lack of adherence to requirements identified in authorization documents:

1. A laser was being installed and commissioned without a fully executed AHD. While there was inadequate LSO follow through with the submitted AHD, we are concerned that the laser operators (PIs, post-doc's and students) who had taken several required laser safety training did not recognize that a current AHD was necessary to begin work. In addition, when the missing AHD was being reviewed it was found that not all have taken this – we could change the wording to not all) of the laser operators had taken the newer and recently required laser safety course EHS0287 and EHS0289. These employees seem to not have been fully aware of these new requirements despite working in a Class 4 laser lab.
2. In the order of NO gas for an experiment covered under an AHD, a researcher tried to order a significantly larger quantity than the AHD allowed (40 times larger). It is noteworthy that this was promptly caught via the procurement system and sent to the appropriate EH&S professional for assistance. However, the concern is that the limitations imposed by the AHD were not familiar to the researcher.

5. Feedback and Improvement

There are several aspects to this topic: self-assessment activities, implementation of corrective actions, dissemination of lessons learned and response to external reviews such as IFA or MESH.

The Division has made improvements in this area by providing checklists, increasing inspections and tracking. As noted above, the Division was able to include campus labs in this process. Corrective actions have been implemented for deficiencies but it is not clear how the lessons learned from these incidents are disseminated (with the exception of the Superglue incident).

Some of the items identified in previous MESH reviews have been addressed: communication channels have been improved; PIs are doing more review of their programs; ES&H topics are more frequently discussed.

Noteworthy: The Division has made several changes in personnel, including the Deputy Division Director and Safety Coordinator. They and other senior Division personnel have made many changes in the Division, and they seem to embrace EH&S rather than view it as an impediment to their work. The Division Director is also on the campus Non-Ionizing Radiation Safety Committee, which oversees campus laser safety policy – his position on this committee could help improve lab-campus laser safety issues.

Noteworthy: The HERL facility has made substantial progress in clearing the legacy waste issues and working with EH&S personnel.

Noteworthy: The division's self-assessments where all LBNL located PI's completed a detailed questionnaire about EH&S practices was a good tool to communicate expectations to the PI's and also to document current practices in the various laboratories.

Observation: Some of the findings from the last MESH report remain. While there has been

some substantial movement and improvements in communication and inspection in the past year, there are still areas such as training and low-level hazard review that have not been systematically addressed.